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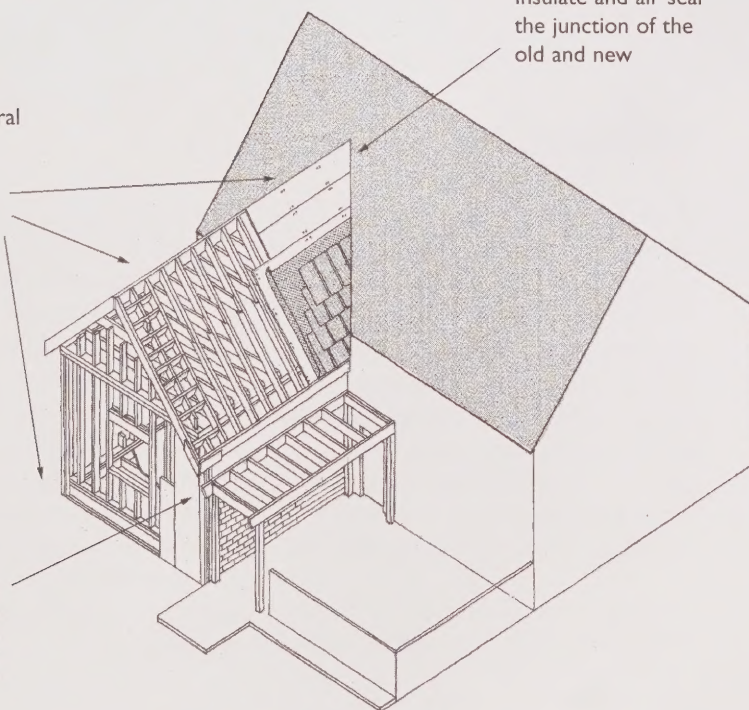
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ABOUT YOUR HOUSE

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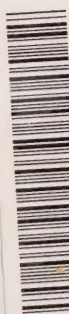
BEFORE YOU START A
NEW ADDITIONIdentify structural
requirements:

- Roof
- Openings
- Foundation

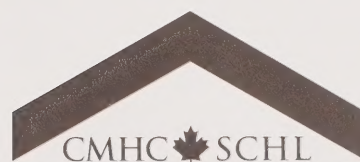
Design details
that complement
the existing
houseInsulate and air seal
the junction of the
old and new

A new addition may be just what it takes to accommodate a changing family or special needs. You can expand a kitchen, add a bath or change your existing home into the house of your dreams.

As with any renovation, the construction of an addition requires careful planning. Before you decide to go ahead with the project, it is important to clearly identify the features you want. Just as important is a thorough inspection of the current structure so that any existing problems can be corrected.



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HOME TO CANADIANS
Canada

Common Situations

Equipment that is not sized or operating properly is less effective, may use more energy, have higher operating costs and compromise the health and safety of all occupants.

There are many reasons that may prompt you to assess the comfort and safety of your HVAC equipment:

- **Equipment age and noise**—old equipment may not provide adequate heat and air exchange. A deteriorating or improperly installed system can be noisy.
- **Smells**—wood smoke or combustion gas smells may indicate chimney problems or dangerous spillage from fuel burning equipment. Inadequate air exchange may cause stale air or lingering smells.
- **Comfort**—there may be cold spots, excessive dust, humidity problems or stale air that makes the house noticeably uncomfortable.
- **Other renovation work**—this can be an opportune time to modernize the heating system in the house and to install a proper ventilation system where one does not exist. It is important that mechanical systems do not change the balance between the air pressure inside the house and the air pressure outside. Lower air pressure inside the house can lead to problems of combustion spillage from furnaces, hot water heaters or fireplaces. Many modern kitchens incorporate very powerful exhaust fans that can cause major pressure differences.

Healthy Housing™

Renovating is an ideal time to make your house healthier for you, the community and the environment. When assessing the comfort and safety of your mechanical systems, be sure to consider:

- **Occupant health**—adequacy of exhaust systems for combustion appliances, a ventilation system for occupants.
- **Energy efficiency**—efficiency of motors in the heating and ventilation equipment, efficiency of heating, cooling and hot water heating equipment.
- **Resource efficiency**—measures to reduce space heating needs (upgrading insulation, draftproofing, HVAC appliances that use the least amount of energy, solar and wind energy) to reduce the home's environmental impact.
- **Environmental responsibility**—HVAC appliances and occupant practices to reduce energy environmental impacts.
- **Affordability**—energy efficient appliances to reduce ongoing operating costs.

House as a System

A house is much more than just four walls and a roof—it's an interactive system made up of many components including the basic structure, heating, ventilating and air conditioning (HVAC) equipment, the external environment and the occupants. Each component influences the performance of the entire system. A renovation provides an opportunity to improve how your house performs.

The comfort and safety of HVAC systems very much depends on how

the equipment is integrated into the house. Exhaust fans must not compromise the venting of combustion appliances. Additional fans may require special provisions for make-up air. Structural changes made as part of renovations may improve draft proofing and insulation, resulting in increased occupant comfort and house durability. However, these changes may alter the venting of combustion appliances and the supply of fresh air for occupants.

Avoid Surprises

Knowing the properties and operating characteristics of your heating and ventilation system will help you to decide the changes you

may want to consider. Here are some of the likely situations that people encounter. However, every situation is unique and you may need to hire a

qualified professional to do a thorough investigation, find the problems and suggest the best solutions.

Ask yourself...

Consider your options...

...and if you don't

Equipment age and noise

- | | | |
|---|---|---|
| <ul style="list-style-type: none">• How old is the furnace?• When was the last maintenance service done? | <ul style="list-style-type: none">• Repair or replace old equipment. Every piece of equipment has a natural life span even if it's maintained correctly.• Maintain equipment regularly so that it operates safely and efficiently. | <ul style="list-style-type: none">• Old furnace motors are not as efficient as newer models. Hot water-based heating systems may have inefficient boilers and pumps.• Inadequate maintenance shortens equipment life span and can lead to premature failure, incomplete fuel combustion and backdrafting of combustion gases. Clogged filters are a fire hazard. Cracked heat exchangers allow combustion gases into the home's air. |
| <ul style="list-style-type: none">• Is the heating system making too much noise? | <ul style="list-style-type: none">• Have your HVAC system assessed by a professional HVAC contractor. Noise in a forced warm air heating system may be the result of fans and blowers that are not maintained or properly attached to the house structure. Noise can also be created because of undersized ducts.• In water based (hydronic) heating systems, noise may be generated as pipes expand and contract when the system heats up and cools down. Some noise may be the result of improperly attached pipes that do not allow for thermal expansion and contraction. The water in the system could also be too hot. | <ul style="list-style-type: none">• Noisy heating system components, particularly fans and pumps, can suggest that they are near the end of their useful life and could fail at any time. |

Ask yourself...

Consider your options...

...and if you don't

Structural problems

- Are there any structural deficiencies in the existing house that will affect the addition?
- Does the addition design maintain a roof profile to provide water drainage and proper structural details? Will the entire roof have to be refinished at the time the addition is built?
- What type of foundation will the new addition need and how will it be tied in to the existing structure?
- Are there unusual loads that will have to be supported?
- Can the existing foundation drainage system be used? Will a new foundation drain system be needed?
- Will structural walls or lintels need to be removed or upgraded?
- How will the need for stairways affect the structure or design of the living space?
- What insulating and air sealing can be done to provide a comfortable, energy efficient space?
- Identify any structural deficiencies before you start. Consult with a structural engineer or architect.
- Repair and renovate structural components so that they are adequate to carry the new loads.
- Plan for good drainage, particularly for intersecting roofs.
- Use accepted foundation construction practices suitable for local soil and water conditions to ensure a well insulated, dry foundation that will carry the loads placed on it by the new structure.
- Hire a professional renovator who will ensure that the addition will meet all applicable building code requirements.
- Choose contractors who are familiar with the type of work you are planning and who use energy efficient and Healthy Housing™ construction practices.
- Unforeseen problems will lead to unexpected costs and delays during construction.
- Structural deficiencies can lead to cracked finishes, floor vibration, bowed or displaced walls, floors or roof structures and possible structural failure.
- Foundation deficiencies can lead to a damp basement or cracks caused by settling or from the pressures of wet or frozen soil.
- Failure to meet building code requirements may lead to unsafe conditions in the building.
- Poor insulation and air sealing will result in higher than necessary energy costs, possible condensation problems and an uncomfortable living space.

Rewards

- A warm, comfortable addition that meets your space requirements, has good lighting and is a well-designed living space is the result of thorough planning and good choices.
- A well thought out and executed addition will increase the value of your house.
- Repairing structural problems, leaks and upgrading services will prolong the life of your house and make the addition look and work better.
- By using low odour and easy-to-clean finishes, you will improve the IAQ of your home.
- A well-insulated addition will provide warmer interior surfaces that will help to prevent condensation and mold growth.

Moisture

- Is there any evidence of moisture problems with the existing building including finishes damaged by moisture, water stains or visible mold growth on any surfaces, blistering or peeling paint, cracked or missing caulking or condensation on windows, walls or ceiling surfaces.
- Determine, then eliminate the source of the moisture that is causing the problems. It may be from rain, plumbing leaks or condensation of vapour on cold surfaces.
- Clean up visible mold growth according to CMHC guidelines.
- Insulate and air seal exterior walls and ceilings. Use energy efficient windows to provide warmer inside surface temperatures.
- Repair or replace all deteriorated finishes or structural components
- Provide ventilation and eliminate sources of moisture to control high humidity.
- Maintain caulking, grout and flashings to prevent water access to the building structure.
- Unresolved water damage problems will continue and lead to further deterioration of the building or newly renovated areas.
- Mold growth caused by excess moisture can be a serious source of indoor air quality (IAQ) problems.
- Superficial cleanup or hiding moisture damage behind new finishes will allow deterioration to continue.
- Poor insulation can lead to cold surfaces that are prone to condensation.
- Uncontrolled humidity can lead to condensation, mold growth and deterioration.
- Poorly maintained caulking and flashing can lead to water leaks.

Skills to Do the Job

A homeowner with good construction skills may be able to do some of the work on the renovation such as:

- Demolition, including the removal of fixtures, finishes and non-load bearing walls.
- Caulking or repairing of roof and window leaks.
- Installing insulation and air sealing of the building.
- Painting.

Consider a professional renovator to manage the project and for structural and finish work. If you are doing it yourself, you will still need to hire subcontractors to do the electrical, plumbing, heating and ventilation work. You may also want to hire other tradespeople to do roofing, window, door, cabinet and flooring installation, or paint and drywall finishing. Remember to obtain all necessary

permits, get written contracts that describe all aspects of the job, including lien protection. Ensure that workers use safe working practices, are covered by workers' compensation and have their licences where required. Protect yourself, your family and your home.

Ask yourself...

Consider your options...

...and if you don't

- Does there seem to be stale air in the house? Do smells linger?
- Is the house too humid?

- Install a heat recovery ventilator that can operate continuously, at low speed. Exhaust-only ventilation systems do not provide a balanced flow (like heat recovery ventilators) and can result in lower air pressures in the house, compared to the outside. This can cause combustion appliances to backdraft.
- Choose a quiet, good quality fan for the main bathroom with a timer switch that can be set to operate at least eight hours in every 24, either in one period, or in several periods spread over the day and night. Make sure that the kitchen range hood fan exhausts to the exterior.

- Inadequate air change rates in the house create poor indoor air quality conditions that can compromise health over time.
- Excessive humidity build-up can deteriorate finishes, the structure and contribute to mold growth.

- Is the house very dusty?

- Air-seal and draftproof the house. High dust levels in the house are a sign of excessive air leakage from outside.
- Vacuum frequently to remove dust.
- Add a medium efficiency pleated filter or electronic filter to the forced air heating system. The filter will capture a lot of the dust within the house. However, the fan must be adequately sized and set to operate continuously to move air past the filter.

- The house will continue to be drafty and dusty.
- If the fan does not operate continuously, the filter will not do anything. Continuous operation of an improperly sized fan with an inefficient motor can increase electrical power consumption.

- Is the house too humid or too dry at various times of the year?

- Repair, replace or install a new mechanical ventilation system. High humidity in the winter is usually an indicator of very low air exchange in a well air-sealed house. Some houses may have high humidity in the summer. This may be a result of local climate conditions (hot, humid, summer weather in central Canada).
- Install a dehumidifier, especially if the house is not air-conditioned. An air-conditioning system should help dehumidify the air. Too low a humidity level in the winter is an indicator of excessive air change rates. Air sealing the house will reduce the uncontrolled air change.

- High humidity creates unhealthy conditions. Molds, fungi and mites thrive in warm, damp environments.
- Excessively dry conditions dry our mucous membranes, lowering our resistance to bacteria.

Other renovation work

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> • Is there any renovation work planned that will require changes in the HVAC equipment or ducts throughout the house? • Will a new addition exceed the demand of the current HVAC equipment? | <ul style="list-style-type: none"> • Assess how extensive the changes will need to be to the HVAC system. If significant changes are planned or your system is close to the end of its life span, it may be cost effective to install new, more efficient equipment. Remember that the house is a system. New windows or air sealing may reduce the demand of HVAC or create the need for controlled make-up or combustion air. • Upgrade or replace the HVAC equipment to meet new demands. | <ul style="list-style-type: none"> • New equipment may need to be installed in the near future that could cause added disruption. • Undersized or inadequate equipment will not provide the comfort and service that you expect. |
|---|--|--|

Skills to Do the Job

Basic mechanical systems maintenance, including filter replacement and motor oiling as identified in manufacturers' manuals, is a job you can do. However, qualified HVAC contractors must do

any adjustments or equipment upgrades that are needed.

Your local energy utilities and heating industry associations can give you

information and refer you to competent tradespeople. Heating systems distributors in your area can also give you references to the local associations and tradespeople.

Rewards

- | | | |
|---|---|---|
| <ul style="list-style-type: none"> • A properly operating HVAC system not only maintains comfortable indoor conditions, but also ensures a | <p>healthier home environment for you and your family.</p> <ul style="list-style-type: none"> • Your new mechanical systems will | <p>have lower operating costs, increased safety and give you peace of mind.</p> |
|---|---|---|

Use the New Addition Assessment Worksheet to consider the existing structure, elements for the new addition and to do the preliminary costing.

New Addition Assessment Worksheet			
	Key considerations	Proposed changes	Cost
Assessment of existing structure			
Roof and walls of existing building			
Foundation			
Landscaping			
New addition			
Design and permit			
Excavation, backfill and compaction			
Foundation work			
Carpentry labour			
Building supplies			
Drywall installation and finish			
Electrical			
Plumbing			
Heating			
Ventilation			
Windows and doors			
Exterior finishes			
Painting			
Cabinets or shop work			
Flooring			
Lighting			
Furnishings			
Waste disposal			
Other			

Costing Your Project

The cost of the renovation work will depend on the condition of the existing structure, local labour and material costs and the extent of the work to be done. Costs of finishes and fixtures vary widely. A good budget checklist will help you to

develop a realistic cost for the project before you start.

If the addition is substantial, provide a comfortable budget contingency to allow for unforeseen work that may need to be

done. The size of contingency will depend on the nature of the project, but may need to be 20 per cent or more of the initial budget. This applies, regardless of how the project contracting is going to be handled.

Other useful information from Canada Mortgage and Housing Corporation

Before You Renovate Renovation Guide and Catalogue, Free (61001)

Building Materials for the Environmentally Hypersensitive, \$29.95 (61089)

Canadian Wood-Frame House Construction, \$25.95 (61010)

Healthy Housing Renovation Planner, \$34.95 (60957)

Homeowner's Inspection Checklist, \$19.95 (62114)

Homeowner's Manual, \$39.95 (61841)

Inspecting Your Home video, \$19.95 (61765)

Renovator's Technical Guide, \$34.95 (61946)

The Clean Air Guide: How to Identify and Correct Indoor Air Problems in Your Home, \$ 5.95 (61082)

About Your House fact sheets, Free

Measuring Humidity in Your Home, (62027)

Combustion Gases in Your Home, (62028)

Your Furnace Filter, (62041)

How to Hire a Contractor, (62277)

Assessing the Comfort and Safety of Your Home's Mechanical Systems, (62266)

To order these publications (order number is shown in brackets) and to find out about other CMHC publications, contact:

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Ottawa ON K1A 0P7

Phone: **1 800 668-2642**

Fax: 1 800 245-9274

Visit our home page at **www.cmhc-schl.gc.ca**

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